The present application was filed on January 20, 2000 with claims 1 through 12. Claims 1 through 12 are presently pending in the above-identified patent application.

5   In the Office Action, the Examiner rejected claims 1, 4, 7, and 10 under 35 U.S.C. § 102(e) as being anticipated by Cruickshank et al. (United States Patent Number 6,389,005) and rejected claims 2, 5, 8, and 11 under 35 U.S.C. §103(a) as being unpatentable over Cruickshank et al., and further in view of Adelman et al. (United States Patent Number 6,006,259). The Examiner also indicated that claims 3, 6, 9, and 12 would be allowable if rewritten in independent form including all of the limitations of the base claims and any intervening claims.

10   The present invention is directed to a method and apparatus for congestion management in a multi-branch Internet Protocol (IP)-based private branch exchange (PBX) switch. The multi-branch IP-based PBX switch is interconnected through (i) a packet network referred to as the primary network, such as a wide area network (WAN), and (ii) an alternate network, such as the public switched telephone network (PSTN). Packet phone adapters (PPAs) associated with each packet telephone unit

15   monitor packet telephone calls and report delay information to communication servers. The communication server can reroute the packet telephony calls through the secondary network upon detection of congestion in the underlying primary network, thereby preserving voice quality.

Independent Claims 1, 4, 7 and 10

Independent claims 1, 4, 7, and 10 were rejected under 35 U.S.C. § 102(e) as being

20   anticipated by Cruickshank et al.

Regarding claims 1, 4, and 10, the Examiner asserts that Cruickshank teaches "a congestion indicator status associated with each path in said primary network, said congestion indicator status indicating whether said path is congested and based on congestion data from at least one device that participated in a packet telephony communication."

25   Applicants note that Cruickshank teaches that a Quality of Service parameter should be used to determine the network on which a call should be routed. In particular, Cruickshank teaches:

whenever a call is established over the internet, PBX 14 monitors the quality of
service (QoS) of the internet call path (block 134). This involves measuring such

30   parameters as *packet delay, the number of data packets dropped and throughput.*
Preferably QoS is measured using the known Real-Time Transport Control Protocol
(RTCP).

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Col. 2, lines 32-36.

Thus, Cruickshank monitors QoS parameters such as packet delay, packets dropped and throughput. Cruickshank does not address the monitoring of *congestion*.

5   Applicants note that there is a *significant difference* between the monitoring of the QoS parameters taught by Cruickshank and the monitoring of congestion, as required by the present invention. The QoS parameters cited by Cruickshank do not accurately predict congestion and vice versa.

For example, the QoS parameters cited by Cruickshank can falsely determine that there

10   is congestion within a path of a network when, in fact, congestion does not exist. Consider the case where a "packets dropped" parameter drops below a minimum quality of service threshold. In some cases, this could be the result of buffer overflow at an outgoing network link due to congestion. In other cases, dropped packets could be the result of corrupted packet headers due to bit errors occurring in the network (especially in wireless networks) or the result of an overloaded receiver, even though

15   congestion was not present in the network. Thus, when the "packets dropped" parameter drops below a minimum threshold, it is <u>not</u> necessarily an indicator of congestion.

Similarly, while a long packet delay parameter can be indicative of congestion if it is the result of relatively full buffers on outgoing network links, it could also be the result of delays in sending the packet to the network from the packet's source, or could result from complex packet processing

20   tasks required at intermediate network nodes, such as firewalls, even though congestion was not present in the network. Thus, packet delay is not necessarily an indicator of congestion.

Similarly, the use of the QoS parameters cited by Cruickshank can falsely determine that there is *no* congestion within a path of a network when, in fact, congestion does exist. For example, upon a network congestion condition, packets will be dropped in the short term and there will be a

25   temporary improvement in the QoS parameters. Such improved QoS parameters, however, are not indicative of no congestion, but rather, merely reflect the fact that packets were dropped and there was a temporary improvement in network conditions. The effect of dropping packets could result in a shorter packet delay for the packets that remain in the network, a condition typically associated with no congestion. Thus, the shorter packet delay could falsely indicate that congestion does not exist when, in

30   fact, there is network congestion.

Independent claim 1 requires "a congestion indicator status associated with each path in said primary network, said congestion indicator status indicating whether said path is congested;" independent claims 4 and 10 require setting "a congestion indicator flag associated with said path if said congestion data indicates that a path associated with said packet telephony communication is

5   congested;" and independent claim 7 requires "reporting said congestion data to a centralized server that performs overload control, whereby said centralized server evaluates said congestion data to determine if a path associated with said packet telephony communication is congested."

Thus, Cruickshank does not disclose or suggest a "congestion indicator" or "congestion data," as required by independent claims 1, 4, 7, and 10.

10   <u>Dependent Claims 2-3, 5-6, 8-9 and 11-12</u>

Dependent claims 2, 5, 8, and 11 were rejected under 35 U.S.C. §103(a) as being unpatentable over Cruickshank et al., and further in view of Adelman et al. Claims 2-3, 5-6, 8-9 and 11-12 are dependent on claims 1, 4, 7, and 10, respectively, and are therefore patentably distinguished over Cruickshank et al. and Adelman et al. (alone or in any combination) because of their dependency

15   from amended independent claims 1, 4, 7, and 10 for the reasons set forth above, as well as other elements these claims add in combination to their base claim. The Examiner has already indicated that claims 3, 6, 9, and 12 would be allowable if rewritten in independent form including all of the limitations of the base claims.

<u>Conclusion</u>

20   All of the pending claims, i.e., claims 1 through 12, are in condition for allowance and such favorable action is earnestly solicited.

If any outstanding issues remain, or if the Examiner has any further suggestions for expediting allowance of this application, the Examiner is invited to contact the undersigned at the telephone number indicated below.

The Examiner's attention to this matter is appreciated.

Respectfully submitted,

5   Date: November 25, 2003

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